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Environmental Radiation Data
Report 38, April-June 1984

(U.S.) Eastern Environmental Radiation Facility
Montgomery, AL

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Report 38

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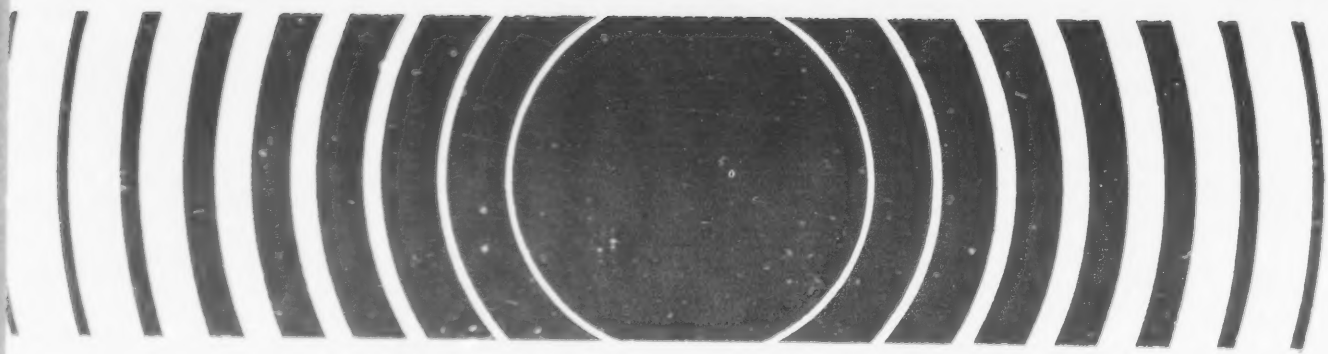

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16. ABSTRACT

Environmental Radiation Data (ERD) is compiled and contains data from the Environmental Radiation Ambient Monitoring System (ERAMS). The ERAMS is comprised of nationwide sampling stations that provide air, surface and drinking water, and milk samples from which environmental radiation levels are derived.

The radiation analyses performed on these samples include gross alpha and gross beta levels, gamma analyses for fission products, and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton, and tritium.

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E N V I R O N M E N T A L

R A D I A T I O N

D A T A

REPORT 38

April - June 1984

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Office of Radiation Programs

Preface

Environmental Radiation Data (ERD) is compiled and distributed quarterly by the Office of Radiation Programs' Eastern Environmental Radiation Facility (EERF), Montgomery, Alabama and contains data from the Environmental Radiation Ambient Monitoring System (ERAMS). Data from similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in the ERD when available.

ERAMS was established in 1973 by the U. S. Environmental Protection Agency's Office of Radiation Programs (ORP). The ERAMS is comprised of nationwide sampling stations that provide air, surface and drinking water, and milk samples from which environmental radiation levels are derived. The major emphasis for ERAMS is toward identifying trends in the accumulation of long-lived radionuclides in the environment.

Sampling locations are selected to provide optimal population coverage while functioning to monitor fallout from nuclear devices and other forms of radioactive contamination of the enviromnent. The radiation analyses performed on these samples include gross alpha and gross beta levels, gamma analyses for fission products, and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton, and tritium. This monitoring effort also provides ancillary information on natural background levels and on releases into the environment from stationary sources such as nuclear power reactors, fuel fabrication facilities, and reprocessing plants.

ENVIRONMENTAL RADIATION DATA

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DATA - Reporting Rationale and Procedures

The intent of EPA's Office of Radiation Programs in establishing the Environmental Radiation Ambient Monitoring System was to provide continuous, accurate and usable environmental radiation data for the public. Therefore, new data reporting procedures were developed to allow better interpretation of the data. The most significant change in this reporting procedure is that all specific radionuclide analyses will be reported as the counting results indicate, whether the number is negative, zero, or positive.

Reporting Rationale

Frequently, concentrations of a radionuclide in environmental media are close to zero. When the actual concentration of a nuclide is zero, the net counting results should statistically show a distribution of negative and positive numbers about zero. This occurs when the background count is subtracted from a sample which has only background activity. Prior to July 1975, ERAMS data were not reported numerically when the results were less than a specified reporting level or minimum detectable level. The present reporting procedure allows all the data to be reported and evaluated statistically without an arbitrary cutoff of small or negative numbers. This approach will facilitate estimates of bias in the nuclide analyses and will allow better evaluation of distributions and trends in environmental data.

When reviewing the data in this report, caution should be exercised in the interpretation of individual negative values. Obviously, a negative activity value does not have physical significance. Such numbers, however, are significant when taken together with other observations which indicate that the true value of a distribution is near zero. When an average of several measurements produces a result less than zero, this indicates a negative bias in the measurement procedure.

(1) Reported Values

Specific Analyses - All specific radionuclide analyses will be reported as the counting results indicate, whether the number is negative, zero, or positive. All reported values are corrected for decay to the collection date.

Gross Analyses - The actual value of gross radioactivity measurements will be reported, unless the value is below the minimum detectable level (MDL) at the 2 sigma confidence level, then < minimum detectable level will be reported.

MDL is defined as the 3 sigma error of the background. A tabulation of MDL's is given in the following table.

(2) Reported Error Terms

Each reported value for specific analyses will be accompanied by a counting error term at the 2 sigma (95%) confidence interval. Potassium concentrations are determined by specific activity analyses. Error terms are therefore reported as counting errors. At the very low levels characteristic of most ERAMS measurements, counting error is the greatest contributor to overall error.

(3) Significant Figures

All reported values will be rounded to no more than three significant figures. The last significant figure will be increased by one if the figure following is five or greater, otherwise it is left unchanged.

(4) Reporting Levels

The reporting units, smallest increments for reporting, and minimum detectable levels for each isotope are shown in table 1. Smallest increments are sometimes considerably smaller than minimum detectable amounts to avoid truncation errors in averaging.

(5) Averages

Averages will be calculated along with appropriate error terms in an annual summary and analysis of ERAMS data. In calculating these averages, all values of individual data including negative numbers will be utilized. Averages will not be included in ERD quarterly reports.

TABLE 1

ERAMS Reporting Increments and Minimum Detectable Levels

for Radionuclide Analyses

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
Gross alpha	Water	pCi/l	1 pCi/l	2 pCi/l
Gross beta	Air	pCi/m^3	.01 pCi/m^3	.01 pCi/m^3
	Water	pCi/l	1 pCi/l	1 pCi/l
	Precipitation	nCi/m^2	.01 nCi/m^2	.01 nCi/m^2(a)
Tritium	Water	nCi/l	.1 nCi/l	.2 nCi/l
	Milk	nCi/l	.1 nCi/l	.2 nCi/l
Carbon-14	Milk	pCi/l	1 pCi/l	15 pCi/l
Krypton-85	Ambient Air	pCi/m^3	.1 pCi/m^3	2 pCi/m^3
Plutonium-238, 239	Air	aCi/m^3	.1 aCi/m^3	.015 pCi(b) per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Uranium-234, 235,238	Air	aCi/m^3	.1 aCi/m^3	.015 pCi(b) per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Radium-226	Water	pCi/l	.1 pCi/l	.1 pCi/l

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
Strontium-90	Milk	pCi/l	.1 pCi/l	1 pCi/l
	Water	pCi/l	.1 pCi/l	1 pCi/l
Strontium-89	Milk	pCi/l	1 pCi/l	5 pCi/l(c)
Iodine-131	Milk	pCi/l	1 pCi/l	10 pCi/l(c)
	Water	pCi/l	1 pCi/l	10 pCi/l(c)
	Water (specific radiochemical analysis)	pCi/l	.1 pCi/l	.4 pCi/l
Iodine-129	Milk	fCi/l	.1 fCi/l	.4 fCi/l
Cesium-137	Milk	pCi/l	1 pCi/l	10 pCi/l
	Water	pCi/l	1 pCi/l	10 pCi/l
Barium-140	Milk	pCi/l	1 pCi/l	10 pCi/l(c)
	Water	pCi/l	1 pCi/l	10 pCi/l(c)
Potassium	Milk	g/l	.1 g/l	.12 g/l
	Water	g/l	.1 g/l	.12 g/l
Potassium-40	Water	pCi/l	1 pCi/l	100 pCi/l

(a) The value in terms of nCi/m^2 would be dependent on precipitation (mm).
(b) This value in terms of pCi/m^3 would be dependent on the air volume.
(c) Activity as of the day of counting.

ENVIRONMENTAL RADIATION AMBIENT MONITORING SYSTEM (ERAMS)

SECTION I. Air Program

Airborne Particulates and Precipitation

Gross beta radioactivity measurements and certain specific analyses are performed on air particulates and precipitation samples as indicator measurements in assessing the general (national) impact of all contributing sources on environmental levels of radiation.

Airborne particulates are collected continuously at field stations representing wide geographic coverage, including present and potential sources of environmental radioactivity. Sampling sites are located throughout the United States, Virgin Islands, and the Panama Canal.

Filters (10-cm diameter synthetic fiber) from air samplers are changed twice weekly and field measurements are made with a G-M survey meter at 5 hours and 29 hours after collection to allow for radon and thoron daughter product decay. Field estimates are reported to appropriate EPA officials by telephone or mail depending on the activity levels found.

The filters are sent to EERF for more sensitive analyses in a low background beta counter. Gamma scans are performed on all filters showing laboratory gross beta counts greater than 1 pCi/m^3. The lower gross beta values reported for laboratory measurements are largely due to the decay of radionuclides which occurred between the times of the field estimates and laboratory measurements.

Precipitation samples are collected at the field stations where air filters are collected. These samples are also sent to EERF where they are composited monthly for tritium, gross beta activity measurements and gamma scans. Plutonium-238, -239, and uranium-234, -235, and -238 analyses are performed on samples which exceed 2 pCi/liter gross alpha.

Tables 2 - 4 present the monthly average gross beta concentrations in airborne particulates for April - June 1984.

Tables 5 - 7 present the monthly average gross beta concentration in precipitation April - June 1984.

The tritium in precipitation samples for April - June 1984 at the selected stations are shown in Table 8.

A compilation of individual measurements is available from the EPA, EERF, Montgomery, AL 36109.

TABLE 2

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
APRIL 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	8	1.8	0.0	0.5	0.01	0.01	0.01
CA:BERKELEY	8	0.0	0.0	0.0	0.01	0.00	0.00
CA:LOS ANGELES	8	0.6	0.0	0.3	0.02	0.00	0.01
CO:DENVER	7	0.0	0.0	0.0	0.02	0.00	0.01
CT:HARTFORD	9	0.1	0.0	0.1	0.01	0.00	0.00
DE:WILMINGTON	8	0.2	0.0	0.1	0.01	0.00	0.01
FL:JACKSONVILLE	9	0.1	0.0	0.0	0.01	0.01	0.01
FL:MIAMI	9	0.1	0.0	0.0	0.01	0.01	0.01
HI:HONOLULU	8	0.2	0.0	0.1	0.01	0.00	0.01
IA:IOWA CITY	8	0.4	0.0	0.1	0.01	0.00	0.01
ID:BOISE	9	0.6	0.1	0.3	0.02	0.01	0.02
ID:IDAHO FALLS	7	0.0	0.0	0.0	0.02	0.01	0.01
IL:CHICAGO	8	1.1	0.0	0.2	0.02	0.01	0.01
KS:TOPEKA	9	0.6	0.1	0.2	0.01	0.00	0.00
ME:AUGUSTA	9	0.2	0.0	0.1	0.01	0.00	0.01
MI:LANSING	9	0.2	0.1	0.1	0.01	0.00	0.01
MN:MINNEAPOLIS	8	0.4	0.0	0.2	0.01	0.01	0.01
MO:JEFFERSON CITY	8	0.3	0.1	0.2	0.02	0.01	0.01
MS:JACKSON	7	0.2	0.1	0.1	0.02	0.01	0.01
ND:BISMARCK	7	0.3	0.1	0.2	0.02	0.01	0.01
NH:CONCORD	8	0.2	0.0	0.1	0.01	0.00	0.00
NM:SANTA FE	6	0.3	0.0	0.2	0.01	0.01	0.01
NV:LAS VEGAS	9	0.2	0.1	0.1	0.02	0.01	0.01
NY:ALBANY	4	0.1	0.0	0.0	0.01	0.01	0.01
NY:NEW YORK CITY	8	0.1	0.1	0.1	0.01	0.00	0.01
NY:NIAGARA FALLS	8	0.1	0.1	0.1	0.01	0.00	0.01
NY:SYRACUSE	7	0.4	0.0	0.1	0.01	0.00	0.00
NY:YAPHANK	8	0.0	0.0	0.0	0.01	0.00	0.00
OH:COLUMBUS	8	0.4	0.0	0.2	0.01	0.00	0.01
OH:PAINESVILLE	8	0.2	0.1	0.1	0.01	0.00	0.01
OH:TOLEDO	9	0.5	0.1	0.2	0.01	0.00	0.01
OR:PORTLAND	6	0.0	0.0	0.0	0.01	0.00	0.00
PA:HARRISBURG	9	0.3	0.0	0.1	0.01	0.00	0.00
RI:PROVIDENCE	6	0.2	0.0	0.1	0.01	0.00	0.00
SC:BARNWELL	2	0.0	0.0	0.0	0.01	0.01	0.01
SC:COLUMBIA	9	0.9	0.0	0.2	0.01	0.01	0.01
SD:PIERRE	9	0.7	0.1	0.3	0.02	0.00	0.01

TABLE 2 (CONTINUED)

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
APRIL 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
TN:KNOXVILLE	8	0.6	0.1	0.3	0.01	0.00	0.01
TN:NASHVILLE	3	1.1	0.1	0.5	0.01	0.01	0.01
TX:AUSTIN	9	1.4	0.8	1.0	0.02	0.01	0.02
TX:EL PASO	9	0.6	0.1	0.3	0.02	0.01	0.01
UT:SALT LAKE CITY	6	0.1	0.0	0.1	0.02	0.00	0.01
VA:LYNCHBURG	8	0.9	0.0	0.3	0.01	0.00	0.01
WA:SEATTLE	8	0.0	0.0	0.0	0.01	0.00	0.00
WA:SPOKANE	9	0.2	0.1	0.2	0.01	0.00	0.00
WI:MADISON	8	0.3	0.1	0.2	0.01	0.01	0.01
WV:CHARLESTON	7	1.4	0.1	0.5	0.02	0.01	0.01

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES = .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT = .01 pCi/m^3

TABLE 3

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
MAY 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	8	1.4	0.1	0.4	0.01	0.01	0.01
CA:BERKELEY	9	0.0	0.0	0.0	0.01	0.00	0.01
CA:LOS ANGELES	9	0.5	0.1	0.3	0.02	0.01	0.01
CO:DENVER	9	0.0	0.0	0.0	0.03	0.01	0.01
CT:HARTFORD	9	0.2	0.1	0.1	0.01	0.00	0.01
DE:WILMINGTON	9	0.2	0.0	0.1	0.01	0.00	0.01
FL:JACKSONVILLE	8	0.2	0.0	0.1	0.02	0.00	0.01
FL:MIAMI	8	0.0	0.0	0.0	0.01	0.00	0.01
HI:HONOLULU	10	0.2	0.0	0.1	0.01	0.00	0.01
IA:IOWA CITY	9	0.6	0.1	0.4	0.02	0.01	0.01
ID:BOISE	9	0.5	0.1	0.3	0.02	0.00	0.01
ID:IDAHO FALLS	8	0.0	0.0	0.0	0.01	0.01	0.01
IL:CHICAGO	8	0.9	0.0	0.3	0.02	0.01	0.01
KS:TOPEKA	4	0.5	0.2	0.4	0.01	0.00	0.00
ME:AUGUSTA	9	0.2	0.0	0.1	0.01	0.00	0.01
MI:LANSING	9	0.3	0.1	0.2	0.01	0.00	0.01
MN:MINNEAPOLIS	9	0.6	0.1	0.3	0.02	0.01	0.01
MO:JEFFERSON CITY	9	0.4	0.2	0.3	0.02	0.01	0.01
MS:JACKSON	2	0.1	0.1	0.1	0.01	0.01	0.01
NC:CHARLOTTE	1	0.0	0.0	0.0	0.01	0.01	0.01
ND:BISMARCK	9	0.6	0.2	0.3	0.02	0.01	0.01
NH:CONCORD	9	0.1	0.0	0.1	0.01	0.00	0.01
NJ:TRENTON	6	0.5	0.1	0.2	0.01	0.00	0.01
NM:SANTA FE	7	0.7	0.1	0.4	0.01	0.01	0.01
NV:LAS VEGAS	9	0.3	0.1	0.1	0.02	0.01	0.01
NY:ALBANY	5	0.1	0.0	0.0	0.01	0.01	0.01
NY:NEW YORK CITY	9	0.1	0.0	0.1	0.01	0.01	0.01
NY:NIAGARA FALLS	9	0.2	0.1	0.1	0.01	0.01	0.01
NY:SYRACUSE	7	0.1	0.0	0.1	0.01	0.01	0.01
NY:YAPHANK	8	0.0	0.0	0.0	0.01	0.01	0.01
OH:COLUMBUS	8	0.4	0.1	0.2	0.02	0.01	0.01
OH:PAINESVILLE	8	0.2	0.1	0.1	0.01	0.01	0.01
OH:TOLEDO	9	0.6	0.0	0.3	0.03	0.01	0.01
OR:PORTLAND	7	0.0	0.0	0.0	0.00	0.00	0.00
PA:HARRISBURG	7	0.2	0.0	0.1	0.01	0.01	0.01
RI:PROVIDENCE	3	0.0	0.0	0.0	0.01	0.01	0.01
SC:BARNWELL	3	0.0	0.0	0.0	0.01	0.00	0.01
SC:COLUMBIA	9	0.6	0.0	0.2	0.02	0.01	0.01

TABLE 3 (CONTINUED)

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
MAY 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
SD:PIERRE	9	0.3	0.1	0.2	0.01	0.00	0.01
TN:KNOXVILLE	8	2.9	0.1	0.6	0.04	0.00	0.01
TN:NASHVILLE	4	1.8	0.2	1.0	0.01	0.00	0.01
TX:AUSTIN	8	1.8	0.3	0.8	0.04	0.01	0.02
TX:EL PASO	9	0.7	0.2	0.5	0.02	0.01	0.01
UT:SALT LAKE CITY	1	0.0	0.0	0.0	0.00	0.00	0.00
VA:LYNCHBURG	9	0.7	0.1	0.4	0.01	0.01	0.01
VA:VIRGINIA BEACH	3	0.2	0.1	0.1	0.01	0.00	0.01
WA:SEATTLE	8	0.0	0.0	0.0	0.00	0.00	0.00
WA:SPOKANE	9	0.2	0.1	0.2	0.01	0.00	0.01
WI:MADISON	7	0.5	0.1	0.4	0.01	0.00	0.01
WV:CHARLESTON	9	0.5	0.0	0.3	0.02	0.01	0.01

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

TABLE 4

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
JUNE 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	1.3	0.6	0.8	0.02	0.01	0.01
CA:BERKELEY	9	0.0	0.0	0.0	0.01	0.00	0.00
CA:LOS ANGELES	9	0.3	0.0	0.1	0.01	0.00	0.01
CO:DENVER	6	0.0	0.0	0.0	0.02	0.01	0.01
CT:HARTFORD	8	0.3	0.1	0.2	0.02	0.00	0.01
DE:WILMINGTON	8	0.4	0.0	0.1	0.02	0.00	0.01
FL:JACKSONVILLE	8	0.1	0.0	0.1	0.02	0.00	0.01
FL:MIAMI	9	0.0	0.0	0.0	0.01	0.00	0.01
GA:ATLANTA	2	0.1	0.1	0.1	0.01	0.01	0.01
HI:HONOLULU	8	0.1	0.0	0.1	0.01	0.00	0.01
IA:IOWA CITY	7	0.4	0.1	0.2	0.01	0.01	0.01
ID:BOISE	9	0.5	0.1	0.3	0.02	0.01	0.01
ID:IDAHO FALLS	7	0.0	0.0	0.0	0.03	0.00	0.01
IL:CHICAGO	9	0.7	0.1	0.3	0.02	0.01	0.01
KS:TOPEKA	8	0.5	0.1	0.2	0.00	0.00	0.00
ME:AUGUSTA	8	0.3	0.1	0.2	0.01	0.00	0.01
MI:LANSING	8	0.4	0.1	0.2	0.01	0.01	0.01
MN:MINNEAPOLIS	9	1.1	0.1	0.3	0.01	0.01	0.01
MO:JEFFERSON CITY	9	1.5	0.2	0.5	0.03	0.01	0.02
NC:CHARLOTTE	9	0.3	0.0	0.1	0.02	0.01	0.01
NC:WILMINGTON	7	0.1	0.0	0.1	0.01	0.01	0.01
ND:BISMARCK	9	0.4	0.0	0.2	0.02	0.00	0.01
NH:CONCORD	9	0.2	0.0	0.1	0.02	0.00	0.01
NJ:TRENTON	3	0.7	0.1	0.3	0.00	0.00	0.00
NM:SANTA FE	4	0.4	0.2	0.3	0.01	0.01	0.01
NV:LAS VEGAS	8	0.2	0.1	0.1	0.02	0.01	0.01
NY:ALBANY	4	0.1	0.0	0.1	0.01	0.01	0.01
NY:NEW YORK CITY	9	0.2	0.1	0.1	0.02	0.00	0.01
NY:NIAGARA FALLS	9	0.3	0.0	0.2	0.02	0.00	0.01
NY:SYRACUSE	8	0.3	0.0	0.1	0.02	0.00	0.01
NY:YAPHANK	8	0.0	0.0	0.0	0.01	0.00	0.01
OH:COLUMBUS	9	0.9	0.2	0.5	0.02	0.01	0.01
OH:TOLEDO	8	0.8	0.2	0.5	0.03	0.01	0.01
OR:PORTLAND	9	0.0	0.0	0.0	0.01	0.00	0.00
PA:HARRISBURG	4	0.7	0.1	0.5	0.03	0.01	0.02
RI:PROVIDENCE	2	0.1	0.1	0.1	0.01	0.01	0.01
SC:BARNWELL	2	0.0	0.0	0.0	0.01	0.01	0.01
SC:COLUMBIA	9	0.3	0.1	0.2	0.02	0.01	0.01

TABLE 4 (CONTINUED)

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
JUNE 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
SD:PIERRE	8	0.4	0.0	0.2	0.01	0.00	0.01
TN:KNOXVILLE	8	0.8	0.4	0.7	0.03	0.01	0.01
TN:NASHVILLE	3	1.1	0.5	0.8	0.02	0.01	0.01
TX:AUSTIN	9	1.0	0.4	0.8	0.02	0.01	0.01
TX:EL PASO	8	0.6	0.1	0.3	0.01	0.00	0.01
VA:LYNCHBURG	9	1.4	0.4	0.9	0.02	0.01	0.01
VA:VIRGINIA BEACH	3	0.1	0.1	0.1	0.01	0.01	0.01
WA:SEATTLE	8	0.0	0.0	0.0	0.00	0.00	0.00
WA:SPOKANE	8	0.3	0.2	0.2	0.01	0.00	0.01
WI:MADISON	9	0.5	0.1	0.2	0.01	0.00	0.01
WV:CHARLESTON	7	0.5	0.0	0.2	0.03	0.01	0.02

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES = .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT = .01 pCi/m^3

TABLE 5

GROSS BETA CONCENTRATION IN PRECIPITATION

APRIL 1984

LOCATION	DEPTH (mm)	ACT. ± 2s (nCi/m^2)		SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	117.5	0.13	0.07	ND
CA:BERKELEY	21.9	0.01	0.01	ND
CO:DENVER	20.3	0.04	0.01	ND
CT:HARTFORD	113.8	0.32	0.07	ND
DC:WASHINGTON	62.8	0.04	0.02	ND
FL:JACKSONVILLE	148.4	0.12	0.08	ND
FL:MIAMI	71.3	0.11	0.04	ND
ID:BOISE	45.1	0.04	0.02	ND
ID:IDAHO FALLS	37.5	0.04	0.02	ND
IL:CHICAGO	97.4	0.13	0.05	ND
MI:LANSING	100.0	0.07	0.04	ND
MN:MINNEAPOLIS	73.9	0.30	0.05	ND
MS:JACKSON	46.9	0.05	0.02	ND
ND:BISMARCK	38.0	0.02	0.02	ND
NY:ALBANY	123.0	0.18	0.06	ND
NY:NIAGARA FALLS	77.9	0.06	0.03	ND
NY:YAPHANK	27.5	0.03	0.01	ND
OH:COLUMBUS	131.1	0.09	0.05	ND
OH:PAINESVILLE	47.5	0.24	0.04	ND
OH:TOLEDO	67.1	0.09	0.04	ND
OR:PORTLAND	45.0	0.06	0.02	ND
PA:HARRISBURG	249.5	0.43	0.13	ND
SC:BARNWELL	20.3	0.03	0.01	ND
SC:COLUMBIA	23.3	0.06	0.01	ND
SD:PIERRE	38.8	0.02	0.02	ND
TN:KNOXVILLE	60.0	0.02	0.02	ND
TN:NASHVILLE	32.5	0.03	0.01	ND
VA:LYNCHBURG	132.5	0.04	0.05	ND
WA:SEATTLE	70.0	0.11	0.04	ND
WI:MADISON	120.5	0.12	0.06	ND
WV:CHARLESTON	8.4	0.01	0.00	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 6

GROSS BETA CONCENTRATION IN PRECIPITATION

MAY 1984

LOCATION	DEPTH (mm)	ACT. ± 2s (nCi/m^2)		SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	165.0	0.20	0.07	ND
CO:DENVER	26.8	0.02	0.01	ND
CT:HARTFORD	153.1	0.44	0.10	ND
DC:WASHINGTON	166.8	0.18	0.08	ND
DE:WILMINGTON	57.5	0.07	0.03	ND
FL:JACKSONVILLE	34.1	0.02	0.02	ND
FL:MIAMI	97.5	0.04	0.04	ND
ID:BOISE	57.5	0.06	0.03	ND
IL:CHICAGO	143.1	0.13	0.07	ND
ME:AUGUSTA	198.8	0.28	0.11	ND
MI:LANSING	116.3	0.05	0.04	ND
MN:MINNEAPOLIS	64.8	0.15	0.04	ND
MS:JACKSON	42.5	0.03	0.02	ND
NJ:TRENTON	141.2	0.33	0.09	ND
NY:ALBANY	219.2	0.18	0.09	ND
NY:NIAGARA FALLS	143.1	0.11	0.06	ND
NY:YAPHANK	105.0	0.23	0.06	ND
OH:COLUMBUS	146.3	0.16	0.07	ND
OH:PAINESVILLE	246.3	0.53	0.14	ND
OH:TOLEDO	144.8	0.39	0.09	ND
OR:PORTLAND	95.3	0.16	0.05	ND
PA:HARRISBURG	212.5	0.43	0.13	ND
RI:PROVIDENCE	100.0	0.47	0.07	ND
SC:BARNWELL	92.0	0.06	0.04	ND
SC:COLUMBIA	240.5	0.43	0.12	ND
SD:PIERRE	25.0	0.02	0.01	ND
TN:KNOXVILLE	257.5	0.28	0.14	ND
TN:NASHVILLE	122.3	0.11	0.06	ND
TX:AUSTIN	47.5	0.07	0.02	ND
TX:EL PASO	15.0	0.01	0.01	ND
VA:LYNCHBURG	161.0	0.48	0.10	ND
WA:SEATTLE	71.3	0.07	0.04	ND
WI:MADISON	55.0	0.05	0.02	ND
WV:CHARLESTON	32.0	0.08	0.02	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 7

GROSS BETA CONCENTRATION IN PRECIPITATION

JUNE 1984

LOCATION	DEPTH (mm)	ACT. (nCi/m^2)	± 2s	SPECIFIC GAMMA ACT. (pCi/l)
CA:BERKELEY	9.5	0.01	0.00	ND
CO:DENVER	106.3	0.32	0.07	ND
CT:HARTFORD	57.5	0.35	0.04	ND
DE:WILMINGTON	122.5	0.45	0.09	ND
FL:JACKSONVILLE	196.9	0.16	0.09	ND
FL:MIAMI	177.5	0.09	0.07	ND
ID:BOISE	55.8	0.11	0.03	ND
ID:IDAHO FALLS	27.5	0.02	0.01	ND
IL:CHICAGO	113.6	0.28	0.08	ND
MI:LANSING	2.7	0.01	0.00	ND
MN:MINNEAPOLIS	247.0	0.20	0.11	ND
MS:JACKSON	26.9	0.05	0.02	ND
ND:BISMARCK	114.3	0.05	0.04	ND
NH:CONCORD	24.0	0.09	0.02	ND
NJ:TRENTON	79.8	0.17	0.04	ND
NY:ALBANY	110.3	0.11	0.05	ND
NY:NEW YORK CITY	40.0	0.09	0.02	ND
NY:NIAGARA FALLS	110.5	0.07	0.05	ND
NY:YAPHANK	253.8	0.52	0.13	ND
OH:COLUMBUS	33.0	0.03	0.01	ND
OH:PAINESVILLE	91.9	0.18	0.05	ND
OR:PORTLAND	80.0	0.02	0.03	ND
PA:HARRISBURG	204.5	0.38	0.11	ND
SC:BARNWELL	17.5	0.03	0.01	ND
SC:COLUMBIA	93.7	0.31	0.06	ND
SD:PIERRE	81.2	0.01	0.04	ND
TN:KNOXVILLE	20.0	0.05	0.01	ND
TX:AUSTIN	25.0	0.02	0.01	ND
TX:EL PASO	100.0	0.07	0.04	ND
VA:LYNCHBURG	55.0	0.31	0.04	ND
VA:VIRGINIA BEACH	37.5	0.09	0.02	ND
WA:SEATTLE	65.0	0.04	0.03	ND
WI:MADISON	289.5	0.15	0.11	ND
WI:MADISON	53.8	0.07	0.03	ND
WV:CHARLESTON	20.0	0.07	0.01	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 8

PRECIPITATION
TRITIUM CONCENTRATION

APRIL - JUNE 1984

LOCATION	APRIL nCi/l ± 2s	MAY nCi/l ± 2s	JUNE nCi/l ± 2s
AL:MONTGOMERY	0.3 0.2	0.1 0.2	0.3 0.2
CA:BERKELEY	NS	NS	0.2 0.2
CO:DENVER	0.4 0.2	0.1 0.2	0.2 0.2
CT:HARTFORD	0.2 0.2	0.3 0.2	0.3 0.2
DC:WASHINGTON	0.2 0.2	0.3 0.2	NS
DE:WILMINGTON	NS	0.2 0.2	0.1 0.2
FL:JACKSONVILLE	0.3 0.2	0.2 0.2	0.2 0.2
FL:MIAMI	0.6 0.2	0.1 0.2	0.1 0.2
ID:BOISE	0.3 0.2	0.1 0.2	0.2 0.2
ID:IDAHO FALLS	0.4 0.2	NS	0.1 0.2
IL:CHICAGO	0.3 0.2	0.1 0.2	0.1 0.2
ME:AUGUSTA	NS	0.3 0.2	NS
MI:LANSING	0.2 0.2	0.1 0.2	0.3 0.2
MN:MINNEAPOLIS	0.3 0.2	0.3 0.2	0.3 0.2
MS:JACKSON	0.3 0.2	0.1 0.2	0.1 0.2
ND:BISMARCK	0.3 0.2	NS	0.5 0.2
NH:CONCORD	NS	NS	0.4 0.2
NJ:TRENTON	NS	0.5 0.2	0.2 0.2
NY:ALBANY	0.2 0.2	0.3 0.2	0.2 0.2
NY:NEW YORK CITY	NS	NS	0.2 0.2
NY:NIAGARA FALLS	0.3 0.2	0.4 0.2	0.3 0.2
NY:YAPHANK	0.1 0.2	0.4 0.2	0.3 0.2
OH:COLUMBUS	0.2 0.2	0.1 0.2	0.3 0.2
OH:PAINESVILLE	0.3 0.2	0.2 0.2	0.3 0.2
OH:TOLEDO	0.1 0.2	0.2 0.2	NS
OR:PORTLAND	0.1 0.2	0.1 0.2	0.2 0.2
PA:HARRISBURG	0.2 0.2	0.4 0.2	0.3 0.2
RI:PROVIDENCE	NS	0.3 0.2	NS
SC:BARNWELL	1.0 0.2	1.9 0.2	0.3 0.2
SC:COLUMBIA	0.4 0.2	0.6 0.2	1.7 0.2
SD:PIERRE	0.2 0.2	0.2 0.2	0.6 0.2
TN:KNOXVILLE	0.3 0.2	0.2 0.2	0.3 0.2
TN:NASHVILLE	0.9 0.2	0.3 0.2	0.3 0.2
TX:AUSTIN	NS	0.1 0.2	0.3 0.2
TX:EL PASO	NS	0.2 0.2	0.2 0.2
VA:LYNCHBURG	0.2 0.2	0.3 0.2	NS
VA:VIRGINIA BEACH	NS	NS	0.2 0.2
WA:SEATTLE	0.3 0.2	0.1 0.2	0.2 0.2
WI:MADISON	0.2 0.2	0.1 0.2	0.3 0.2
WV:CHARLESTON	0.2 0.2	0.3 0.2	0.2 0.2

NS NO SAMPLE
s SIGMA COUNTING ERROR

Plutonium and Uranium in Airborne Particulates

Environmental radiation levels of plutonium and uranium are determined by the analyses of quarterly composite samples (air filters) collected from the 67 continuously operating airborne particulate samplers.

Analyses of the composited filters consist of ashing, separating by liquid ion exchange, and coprecipitation of the plutonium or uranium.

Concentration of the specific isotopes of plutonium-238, -239, and uranium-234, -235, and -238 are determined by alpha spectroscopy. The volume of air passing through the filters normally ranges from 25,000 to 40,000 m^3 for each quarterly composite.

Plutonium and uranium in airborne particulates data for October - December 1983 will be published when available.

Krypton-85

Krypton-85 is a long-lived noble gas with a half life of 10.8 years. It is released into the atmosphere by nuclear reactor operations, fuel fabrication, fuel reprocessing, and nuclear detonations. Krypton-85 also occurs naturally in minor quantities primarily from the neutron capture of stable krypton-84 as well as spontaneous fission and neutron-induced fission of uranium. Monitoring of krypton-85 in the atmosphere has been conducted to identify and establish baseline levels and long-term trends.

Krypton-85 analysis began in January 1973 with sample collections and analyses being performed for 12 sampling locations. These locations were selected to provide atmospheric coverage of the United States with considerations being given to the proximity to fuel reprocessing plants, nuclear reactors, and wide geographic coverage.

Dry compressed air samples, collected at each location, are purchased from commercial air suppliers annually and shipped to the EERF where the krypton-85 is cryogenically separated and counted in a liquid scintillation system.

The Kr-85 results will be published when they are available.

ERAMS

SECTION II. Water Program

The ERAMS water program provides ambient radiation data to assess the effects of nuclear fallout, the natural radiation environment, and other nuclear sources on the nation's rivers, streams and drinking water supplies.

Surface Water

Grab samples are taken quarterly at 58 stations located downstream from operating or future nuclear facilities.

Surface water monitoring consists of tritium analyses quarterly and gamma scans annually. Tritium is the primary radioactive pollutant from nuclear power plants.

Tritium concentrations are determined by liquid scintillation counting of distilled samples. Gamma scans are performed annually to determine if there is a buildup of other contaminants.

Tritium concentrations for surface water samples for April - June 1984 are given in Table 9.

TABLE 9

SURFACE WATER
TRITIUM CONCENTRATION

APRIL • JUNE 1984

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± 2s
AL:DOTHAN	CHATTAHOOCHEE R.	4/20/84	0.3	0.2
AL:SCOTTSBORO	TENNESSEE RIVER	4/ 3/84	0.3	0.2
CA:DIABLO CANYON	PACIFIC OCEAN	4/27/84	0.2	0.2
CA:EUREKA	HUMBOLDT BAY	4/19/84	0.1	0.2
CA:SAN ONOFRE	PACIFIC OCEAN	4/26/84	0.2	0.2
CO:GREELEY	SOUTH PLATTE RIVER	4/16/84	0.3	0.2
CT:EAST HADDAM	CONNECTICUT RIVER	5/ 2/84	0.3	0.2
CT:WATERFORD	LONG ISLAND SOUND	5/ 3/84	0.3	0.2
FL:CRYSTAL RIVER	GULF OF MEXICO	4/ 9/84	0.2	0.2
FL:FT. PIERCE	ATLANTIC OCEAN	4/10/84	0.2	0.2
FL:HOMESTEAD	BISCAYNE BAY	4/20/84	0.2	0.2
IA:CEDAR RAPIDS	CEDAR RIVER	4/17/84	0.2	0.2
ID:BUHL	SNAKE RIVER	4/20/84	0.1	0.2
IL:E. MOLINE	MISSISSIPPI RIVER	5/29/84	0.3	0.2
IL:MORRIS	ILLINOIS RIVER	4/ 7/84	0.3	0.2
IL:OREGON	ROCK RIVER	4/15/84	0.2	0.2
IL:ZION	LAKE MICHIGAN	4/ 3/84	0.7	0.2
LA:NEW ORLEANS	MISSISSIPPI RIVER	4/16/84	0.2	0.2
MA:PLYMOUTH	CAPE CODE BAY	4/ 3/84	0.2	0.2
MA:ROWE	DEERFIELD RIVER	4/24/84	0.3	0.2
MD:CONOWINGO	SUSQUEHANNA RIVER	4/11/84	0.4	0.2
MD:LUSBY	CHESAPEAKE BAY	4/10/84	0.5	0.2
ME:WISCASSET	MONTSEWAY BAY	4/10/84	0.4	0.2
MI:BRIDGMAN	LAKE MICHIGAN	4/ 3/84	0.3	0.2
MI:CHARLEVOIX	LAKE MICHIGAN	4/14/84	0.3	0.2
MI:MONROE	LAKE ERIE	4/16/84	0.2	0.2
MI:SOUTH HAVEN	LAKE MICHIGAN	4/ 2/84	0.4	0.2
MN:MONTICELLO	MISSISSIPPI RIVER	4/ 3/84	0.2	0.2
MN:RED WING	MISSISSIPPI RIVER	4/10/84	0.3	0.2
MS:PORT GIBSON	MISSISSIPPI RIVER	5/17/84	0.2	0.2
NC:CHARLOTTE	CATAWBA RIVER	4/ 9/84	0.3	0.2
NC:SOUTHPORT	ATLANTIC OCEAN	4/ 3/84	0.8	0.2
NE:RULO	MISSOURI RIVER	4/11/84	0.2	0.2
NJ:OYSTER CREEK	OYSTER CREEK	6/26/84	0.2	0.2
NV:BOULDER CITY	COLORADO RIVER	4/ 9/84	0.4	0.2
NY:OSSINING	HUDSON RIVER	4/12/84	0.3	0.2
NY:OSWEGO	LAKE ONTARIO	4/15/84	0.4	0.2
NY:POUGHKEEPSIE	HUDSON RIVER	4/ 4/84	0.4	0.2
OH:TOLEDO	LAKE ERIE	4/ 3/84	0.3	0.2

TABLE 9 (CONTINUED)

SURFACE WATER
TRITIUM CONCENTRATION

APRIL • JUNE 1984

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± 2s
OR:BRADWOOD	COLUMBIA RIVER	4/12/84	0.2	0.2
PA:DANVILLE	SUSQUEHANNA RIVER	4/11/84	0.1	0.2
SC:ALLENDALE	SAVANNAH RIVER	4/30/84	2.0	0.2
SC:BROAD RIVER	BROAD RIVER	4/27/84	0.4	0.2
SC:HARTSVILLE	LAKE ROBINSON	4/ 9/84	0.5	0.2
TN:DAISY	TENNESSEE RIVER	5/30/84	0.4	0.2
TN:KINGSTON	CLINCH RIVER	4/ 3/84	6.0	0.3
TX:EL PASO	RIO GRANDE	4/23/84	0.1	0.2
TX:MATAGORDA	COLORADO RIVER	4/ 1/84	0.2	0.2
VA:DOSWELL	NORTH ANNA RIVER	4/ 5/84	2.7	0.2
WA:NORTHPORT	COLUMBIA RIVER	5/ 8/84	0.3	0.2
WA:RICHLAND	COLUMBIA RIVER	4/13/84	0.2	0.2
WI:TWO CREEKS	LAKE MICHIGAN	4/13/84	0.2	0.2
WI:VICTORY	MISSISSIPPI RIVER	4/ 9/84	0.2	0.2
WV:WHEELING	OHIO RIVER	4/11/84	0.2	0.2

s SIGMA COUNTING ERROR

Drinking Water

The drinking water program provides ambient radiation monitoring relevant to the effects of the nuclear power industry, natural environmental levels, and other pertinent sources. These data serve to assess trends and anomalies in concentrations, and to compare with standards set forth in the EPA "National Interim Primary Drinking Water Regulations." These regulations provide for approval of supplies when the combined radium-226 and radium-228 levels do not exceed 5 pCi/l, when the gross alpha (excluding radon and uranium) levels do not exceed 15 pCi/l, when tritium levels do not exceed 20,000 pCi/l, when the strontium-90 levels do not exceed 8 pCi/l, and when the gross beta levels do not exceed 50 pCi/l.

Grab samples are taken at 78 sites which are either major population centers or selected nuclear facility environs.

The analyses include (a) tritium on a quarterly basis (b) gross alpha, gross beta, strontium-90 and gamma on annual composites. Radium-226 analyses are performed if the gross alpha exceeds 2 pCi/l; and radium-228 analyses are performed if the radium-226 activity falls between 3 and 5 pCi/l) (c) specific iodine-131 is performed on one quarterly sample per year for each station (d) an annual composite for plutonium-238, -239, uranium-234, -235, -238, for stations which demonstrate gross alpha levels greater than 2 pCi/l.

Tritium analyses are performed by scintillation counting of the distilled samples, gross beta, and gross alpha by evaporating an aliquot on stainless steel planchets for counting, and radium-226 by the standard emanation technique. Strontium-90 is determined by beta counting a strontium carbonate precipitate isolated by ion exchange.

The results of tritium in drinking water analyses for April - June 1984 are shown in Table 10.

All samples were taken as either a single grab sample or composite samples taken over 12 to 14 days.

TABLE 10

DRINKING WATER
TRITIUM CONCENTRATION

APRIL - JUNE 1984

LOCATION	DATE COLLECTED	nCi/l	± 2s
AK:FAIRBANKS	4/12/84	0.5	0.2
AL:DOTHAN	4/ 6/84	0.4	0.2
AL:MONTGOMERY	4/18/84	0.2	0.2
AL:MUSCLE SHOALS	4/ 4/84	0.3	0.2
AL:SCOTTSBORO	4/ 3/84	0.4	0.2
CA:BERKELEY	4/ 6/84	0.1	0.2
CA:LOS ANGELES	4/ 5/84	0.3	0.2
CO:DENVER	4/17/84	0.2	0.2
CO:PLATTEVILLE	4/17/84	0.3	0.2
CT:HARTFORD	4/ 5/84	0.1	0.2
DE:DOVER	4/ 4/84	0.3	0.2
FL:MIAMI	4/ 6/84	0.3	0.2
FL:TAMPA	5/ 1/84	0.2	0.2
GA:SAVANNAH	4/16/84	2.3	0.2
HI:HONOLULU	4/18/84	0.1	0.2
IA:CEDAR RAPIDS	4/10/84	0.1	0.2
ID:BOISE	5/ 2/84	0.2	0.2
ID:IDAHO FALLS	4/20/84	0.1	0.2
IL:MORRIS	4/ 4/84	0.8	0.2
IL:W. CHICAGO	4/10/84	0.1	0.2
KS:TOPEKA	4/ 3/84	0.3	0.2
LA:NEW ORLEANS	4/27/84	0.3	0.2
MA:LAWRENCE	4/11/84	0.2	0.2
MA:ROWE	4/24/84	0.2	0.2
MD:BALTIMORE	4/ 5/84	0.2	0.2
MD:CONOWINGO	4/11/84	0.1	0.2
ME:AUGUSTA	4/ 9/84	0.3	0.2
MI:DETROIT	4/18/84	0.3	0.2
MI:GRAND RAPIDS	4/10/84	0.3	0.2
MN:MINNEAPOLIS	4/ 5/84	0.2	0.2
MN:RED WING	4/10/84	0.1	0.2
MS:JACKSON	4/ 3/84	0.2	0.2
MS:PORT GIBSON	4/10/84	0.1	0.2
MT:HELENA	4/ 9/84	0.4	0.2
NC:CHARLOTTE	4/ 9/84	0.4	0.2
NC:WILMINGTON	4/ 8/84	0.4	0.2
ND:BISMARCK	4/11/84	0.3	0.2
NE:LINCOLN	4/27/84	0.2	0.2

TABLE 10 (CONTINUED)

DRINKING WATER
TRITIUM CONCENTRATION

APRIL - JUNE 1984

LOCATION	DATE COLLECTED	nCi/l	± 2s
NH:CONCORD	4/ 6/84	0.1	0.2
NJ:TRENTON	6/27/84	0.2	0.2
NJ:WARETOWN	6/26/84	0.2	0.2
NM:SANTA FE	4/ 9/84	0.2	0.2
NV:LAS VEGAS	4/10/84	0.3	0.2
NY:ALBANY	4/ 4/84	0.3	0.2
NY:NEW YORK CITY	4/ 5/84	0.3	0.2
NY:NIAGARA FALLS	4/ 4/84	0.3	0.2
NY:SYRACUSE	4/26/84	0.3	0.2
OH:CINCINNATI	4/ 2/84	0.3	0.2
OH:COLUMBUS	4/ 7/84	0.3	0.2
OH:EAST LIVERPOOL	4/11/84	0.2	0.2
OH:PAINESVILLE	4/ 4/84	0.5	0.2
OH:TOLEDO	4/ 4/84	0.2	0.2
OK:OKLAHOMA CITY	4/ 6/84	0.2	0.2
OR:PORTLAND	4/10/84	0.2	0.2
PA:COLUMBIA	4/12/84	0.2	0.2
PA:HARRISBURG	4/11/84	0.2	0.2
PA:PITTSBURGH	4/11/84	0.2	0.2
PC:ANCON	5/ 1/84	0.3	0.2
RI:PROVIDENCE	4/13/84	0.4	0.2
SC:BARNWELL	4/ 5/84	0.2	0.2
SC:COLUMBIA	4/ 5/84	0.3	0.2
SC:HARTSVILLE	4/ 9/84	0.3	0.2
SC:JENKINSVILLE	4/ 6/84	0.2	0.2
SC:SENECA	4/11/84	0.2	0.2
TN:CHATTANOOGA	4/26/84	0.7	0.2
TN:KNOXVILLE	4/ 4/84	0.2	0.2
TX:AUSTIN	4/12/84	0.2	0.2
VA:DOSWELL	4/16/84	0.2	0.2
VA:LYNCHBURG	4/ 4/84	0.3	0.2
VA:VIRGINIA BEACH	4/ 5/84	0.2	0.2
WA:RICHLAND	4/13/84	0.2	0.2
WA:SEATTLE	4/12/84	0.4	0.2
WI:GENOA CITY	4/ 9/84	0.2	0.2
WI:MADISON	4/ 5/84	0.3	0.2

s SIGMA COUNTING ERROR

SECTION III. External Gamma Ambient Monitoring Program

The external gamma monitoring program, which began in October 1978, provides a continuous measurement of ambient gamma exposure rates, including cosmic, at selected sites throughout the continental United States. Data from this program are used to evaluate fluctuations in natural background due to variations in environmental conditions and to provide a means of monitoring any significant increases in ambient gamma levels due to weapons fallout, reactor operations, etc. The program consists of approximately 22 sites representing a wide geographic coverage throughout the country.* Although exposure measurements at these few sites are not totally representative of nationwide exposures, they will be indicative of national trends.

The monitoring program utilizes CaF_2:Mn thermoluminescent dosimeters(TLD's). These dosimeters are commercially available glass-bulb type dosimeters with energy compensating shields. A group of three TLD's is located at each station or site. Dosimeters are annealed by the station operator prior to positioning in the field. The dosimeters are returned to EERF for readout on an approximate one-month cycle.** Several dosimeters are annealed by the station operator as controls and returned with the exposed field dosimeters to correct for any exposures accumulated during shipment.

Results from the period April - June 1984 are shown in Table 11.

* Some of these sites may not return dosimeters each period and consequently the number of sites listed may vary slightly.

** Starting October, 1984, this program will change to a quarterly cycle.

TABLE 11

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE	EXPOSURE RATE	
		MR	MICRO R/HR ± 2 s *	
AL:MONTGOMERY	40284- 50184	4.7	6.8	6.6
AL:MONTGOMERY	50184- 60184	5.0	6.7	4.9
AL:MONTGOMERY	60184- 70284	6.2	8.4	4.8
CA:BERKELEY	33084- 50384	5.4	6.4	8.0
CA:BERKELEY	50384- 60184	4.1	5.8	9.5
CA:BERKELEY	60184- 70584	4.6	5.7	4.3
CO:DENVER	40384- 50284	9.6	13.8	7.1
CO:DENVER	50284- 62984	21.9	15.7	10.1
FL:ORLANDO	32284- 41884	3.5	5.2	12.4
FL:ORLANDO	41884- 50884	2.9	6.0	16.6
FL:ORLANDO	50884- 60184	3.1	5.3	14.4
FL:ORLANDO	60184- 70384	5.7	7.4	8.7
ID:BOISE	40584- 51084	8.9	10.6	5.4
ID:BOISE	51084- 60784	7.2	10.7	12.2
ID:BOISE	60784- 70984	10.1	13.2	9.6
IL:CHICAGO	40584- 50884	5.7	7.2	5.0
IL:CHICAGO	50884- 60584	5.0	7.5	5.0
IL:CHICAGO	60584- 70684	6.0	8.0	5.8
ND:BISMARCK	40284- 50384	7.0	9.5	5.7
ND:BISMARCK	50384- 60184	6.2	8.9	6.8
ND:BISMARCK	60184- 70984	10.6	12.7	5.6
NM:SANTA FE	41084- 51184	10.4	14.0	8.1
NM:SANTA FE	51184- 60484	8.0	13.9	6.6
NM:SANTA FE	60484- 70984	10.8	12.9	3.9
NV:LAS VEGAS	33084- 50184	5.8	7.3	11.0
NV:LAS VEGAS	50184- 53184	4.9	6.8	11.1
NV:LAS VEGAS	53184- 70284	6.7	8.8	6.0
NY:NEW YORK	31284- 41384	6.1	7.7	7.7
NY:NEW YORK	41384- 51684	6.1	7.7	6.5
NY:NEW YORK	51684- 60884	5.4	9.8	5.1
NY:NEW YORK	06884- 71684	7.3	8.0	8.4
OH:COLUMBUS	40284- 50184	5.0	7.2	8.6
OH:COLUMBUS	50184- 60184	5.0	6.7	19.2
OH:COLUMBUS	60184- 70384	6.6	8.5	7.1
OK:OKLAHOMA CITY	31284- 41084	5.3	7.4	8.2
OK:OKLAHOMA CITY	41084- 50384	4.2	7.6	4.7
OK:OKLAHOMA CITY	50384- 71384	14,4	8.4	3.6
OR:PORTLAND	40484- 50484	5.1	7.1	13.0
OR:PORTLAND	50484- 53184	5.4	8.3	14.0
OR:PORTLAND	53184- 70984	8.4	8.9	5.5

TABLE 11 (CONTINUED)

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE	EXPOSURE RATE	
		MR	MICRO R/HR ± 2 s *	
PA:HARRISBURG	40284- 50484	5.1	6.7	8.1
PA:HARRISBURG	50484- 52984	3.9	6.5	6.9
PA:HARRISBURG	52984- 70284	6.7	8.2	5.4
RI:PROVIDENCE	41384- 51084	6.9	10.7	9.2
RI:PROVIDENCE	51084- 61184	8.0	10.5	11.3
RI:PROVIDENCE	61184- 70584	6.1	10.5	6.2
SC:BARNWELL	40584- 50384	5.8	8.6	5.6
SC:BARNWELL	50384- 53184	5.9	8.8	33.6
SC:BARNWELL	53184- 71984	11.3	9.6	2.8
SC:COLUMBIA	33084- 50184	6.0	7.5	10.2
SC:COLUMBIA	50184- 53084	6.2	8.9	7.1
SC:COLUMBIA	53084- 62984	5.8	8.1	8.8
TN:KNOXVILLE	40684- 50184	5.5	9.2	4.8
TN:KNOXVILLE	50184- 53184	6.5	9.0	5.7
TN:KNOXVILLE	53184- 70284	8.2	10.6	3.8
VA:RICHMOND	40284- 50184	6.0	8.7	6.6
VA:RICHMOND	50184- 53184	6.0	8.3	12.3
VA:RICHMOND	53184- 70584	7.3	8.7	4.3
VT:MONTPELIER	40484- 50784	5.7	7.2	5.4
VT:MONTPELIER	50784- 53184	4.4	7.7	5.4

* s = SIGMA ERROR (IN PERCENT)

SECTION IV. Milk Program

Pasteurized Milk

This is a cooperative program of the EPA, ORP and the Dairy and Lipid Products Branch, Milk Sanitation Section, Food and Drug Administration. Milk is a reliable indicator of the general populations intake of radionuclides since it is consumed by a large segment of the population and contains several of the biologically important contaminants resulting from environmental releases from nuclear activities. A primary function of this program is to obtain reliable monitoring data relative to current radionuclide concentrations and determine any long-term trends.

Monthly samples are collected at 65 sampling sites with one or more located in each state, Puerto Rico, and the Panama Canal. These are composite samples representing more than 80 percent of the milk consumed in a given population center.

These samples are analyzed for iodine-131, barium-140, cesium-137, and potassium. All 65 samples are analyzed annually in July for strontium-89, and strontium-90. Also, for the first month of the three quarters beginning January, April and October, 10 regional composite samples of milk made up from the states within each of EPA's 10 regions are analyzed for strontium-89 and strontium-90.

Iodine-131, barium-140, cesium-137 and potassium are determined by gamma spectral analysis. Strontium-89 and strontium-90 are determined by beta counting a total strontium precipitate which has been chemically separated by ion-exchange.

The values from the pasteurized milk samples for April - June 1984 are shown in Tables 12 - 14.

Strontium values from regional composite samples collected April - June 1984 are shown in Table 15.

Carbon-14 in Milk

Nine stations, chosen for wide geographical distribution, contribute milk samples for annual analysis for carbon-14. These samples have monitored the carbon-14 levels in the food chain resulting from nuclear testing.

Analysis consists of combusting the samples and measuring released carbon dioxide through liquid scintillation. Data will be published as it becomes available.

TABLE 12

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

APRIL 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
AL:MONTGOMERY	4/ 5/84	1.60 0.12	4 7	-2 8	3 7
AR:LITTLE ROCK	4/ 2/84	1.51 0.12	7 7	6 8	-5 7
AZ:PHOENIX	4/ 5/84	1.50 0.12	4 7	-2 8	-1 7
CA:LOS ANGELES	4/ 9/84	1.53 0.12	0 7	2 8	0 7
CA:SACRAMENTO	4/ 3/84	1.45 0.12	7 7	1 8	-1 7
CA:SAN FRANCISCO	4/ 3/84	1.48 0.12	3 7	-1 8	0 7
CO:DENVER	4/ 2/84	1.59 0.12	1 7	5 8	-1 7
CT:HARTFORD	4/ 9/84	1.60 0.12	8 7	2 8	-1 7
DC:WASHINGTON	4/ 6/84	1.58 0.12	4 7	6 8	-5 7
FL:TAMPA	4/10/84	1.59 0.12	9 7	3 8	2 7
HI:HONOLULU	4/ 3/84	1.60 0.12	2 7	3 8	1 7
IA:DES MOINES	4/ 2/84	1.47 0.12	0 7	-1 8	0 7
ID:IDAHO FALLS	4/16/84	1.56 0.08	-2 5	1 6	-2 5
IL:CHICAGO	4/ 2/84	1.61 0.12	4 7	-1 8	5 7
KS:WICHITA	4/ 2/84	1.60 0.12	2 7	-3 8	0 7
KY:LOUISVILLE	4/ 3/84	1.70 0.13	0 7	1 8	-2 7
LA:NEW ORLEANS	4/ 2/84	1.68 0.13	5 7	5 8	0 7
MA:BOSTON	4/ 3/84	1.63 0.12	3 7	1 8	-1 7
MD:BALTIMORE	4/ 6/84	1.60 0.08	2 5	0 6	0 5
ME:PORTLAND	4/ 3/84	1.70 0.13	1 7	4 8	6 7
MI:DETROIT	4/ 5/84	1.61 0.12	1 7	-3 8	-4 7
MI:GRAND RAPIDS	4/ 2/84	1.56 0.12	5 7	0 8	-1 7
MN:MINNEAPOLIS	4/ 2/84	1.72 0.13	2 7	-2 8	-1 7
MN:ST PAUL	4/ 2/84	1.65 0.09	0 5	-2 6	-2 5
MO:KANSAS CITY	4/ 5/84	1.52 0.12	1 7	1 8	0 7
MO:ST LOUIS	4/ 4/84	1.56 0.08	0 5	2 6	0 5
MS:JACKSON	4/ 3/84	1.68 0.13	-6 7	0 8	1 7
MT:HELENA	4/ 2/84	1.55 0.12	2 7	0 8	3 7
NC:CHARLOTTE	4/ 2/84	1.66 0.16	8 10	2 14	7 10
NE:OMAHA	4/ 6/84	1.37 0.12	0 7	2 8	2 7
NH:MANCHESTER	4/ 2/84	1.57 0.08	4 5	0 6	0 5
NJ:TRENTON	4/ 5/84	1.63 0.12	4 7	0 8	-6 7
NM:ALBUQUERQUE	4/ 2/84	1.59 0.08	4 5	3 6	1 5
NV:LAS VEGAS	4/ 2/84	1.56 0.08	-2 5	4 6	3 5
NY:BUFFALO	4/ 2/84	1.66 0.09	0 5	0 6	-1 5
NY:NEW YORK CITY	4/ 2/84	1.63 0.12	2 7	3 8	-2 7
NY:SYRACUSE	4/ 2/84	1.60 0.12	3 7	-2 8	4 7
OH:CINCINNATI	4/ 9/84	1.50 0.12	1 7	-1 8	6 7

TABLE 12 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

APRIL 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
OH:CLEVELAND	4/ 9/84	1.55 0.12	-2 7	-5 8	6 7
OK:OKLAHOMA CITY	4/ 2/84	1.78 0.13	2 7	-3 8	4 7
OR:PORTLAND	4/ 3/84	1.63 0.12	0 7	-3 8	1 7
PA:PHILADELPHIA	4/ 2/84	1.59 0.12	1 7	-1 8	3 7
PA:PITTSBURGH	4/ 4/84	1.63 0.12	2 7	3 8	-1 7
PC:CRISTOBAL	4/26/84	1.64 0.12	11 7	2 8	-4 7
PR:SAN JUAN	4/ 6/84	1.64 0.23	6 14	-9 19	13 14
SD:RAPID CITY	4/13/84	1.55 0.12	-1 7	-3 8	2 7
TN:CHATTANOOGA	4/ 2/84	1.65 0.12	5 7	3 8	-1 7
TN:KNOXVILLE	4/ 9/84	1.77 0.23	-1 14	1 20	2 14
TN:MEMPHIS	4/26/84	1.59 0.12	1 7	-9 8	6 7
TX:AUSTIN	4/16/84	1.48 0.12	4 7	2 8	-2 7
UT:SALT LAKE CITY	4/ 2/84	1.56 0.08	2 5	0 6	2 5
VA:NORFOLK	4/16/84	1.64 0.12	2 7	0 8	-1 7
VT:BURLINGTON	4/ 2/84	1.59 0.12	1 7	-1 8	1 7
WA:SEATTLE	4/30/84	1.64 0.12	-1 7	-6 8	-3 7
WA:SPOKANE	4/ 4/84	1.63 0.12	-1 7	-1 8	4 7
WV:CHARLESTON	4/10/84	1.66 0.12	1 7	-2 8	-2 7
WY:LARAMIE	4/ 3/84	1.56 0.12	-1 7	2 8	1 7

s SIGMA COUNTING ERROR

TABLE 13

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

MAY 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
AK:ANCHORAGE	5/ 3/84	1.62 0.08	0 5	-5 6	-3 5
AL:MONTGOMERY	5/10/84	1.58 0.12	4 7	-5 8	-3 7
AR:LITTLE ROCK	5/ 7/84	1.47 0.12	4 7	3 8	5 7
AZ:PHOENIX	5/10/84	1.59 0.08	1 5	0 6	0 5
CA:LOS ANGELES	5/23/84	1.67 0.13	-5 7	-2 8	-2 7
CA:SACRAMENTO	5/ 1/84	1.56 0.12	1 7	2 8	-2 7
CA:SAN FRANCISCO	5/ 9/84	1.51 0.12	-3 7	-1 8	1 7
CO:DENVER	5/ 1/84	1.54 0.12	3 7	-2 8	3 7
CT:HARTFORD	5/ 7/84	1.56 0.12	5 7	-3 8	-3 7
DC:WASHINGTON	5/ 4/84	1.52 0.08	-2 5	0 6	-2 5
FL:TAMPA	5/ 1/84	1.56 0.08	12 5	-5 6	-1 5
GA:ATLANTA	5/ 7/84	1.56 0.12	3 7	-1 8	-3 7
HI:HONOLULU	5/ 1/84	1.66 0.12	1 7	-2 8	-3 7
IA:DES MOINES	5/ 7/84	1.50 0.12	6 7	-9 8	6 7
ID:IDAHO FALLS	5/ 5/84	1.58 0.12	-4 7	-1 8	1 7
IL:CHICAGO	5/ 7/84	1.67 0.12	0 7	-6 8	2 7
IN:INDIANAPOLIS	5/ 7/84	1.56 0.08	2 5	-4 6	0 5
KS:WICHITA	5/ 7/84	1.53 0.12	-4 7	1 8	6 7
KY:LOUISVILLE	5/ 8/84	1.49 0.12	1 7	-2 8	-2 7
LA:NEW ORLEANS	5/15/84	1.68 0.13	1 7	2 8	-3 7
MA:BOSTON	5/ 8/84	1.53 0.12	5 7	0 8	-6 7
MD:BALTIMORE	5/ 2/84	1.56 0.12	-2 7	-2 8	2 7
ME:PORTLAND	5/ 1/84	1.62 0.08	4 5	2 6	-2 5
MI:DETROIT	5/10/84	1.50 0.12	-1 7	-4 8	-1 7
MI:GRAND RAPIDS	5/10/84	1.63 0.12	1 7	-4 8	-5 7
MN:MINNEAPOLIS	5/ 7/84	1.67 0.13	4 7	0 8	-7 7
MN:ST PAUL	5/ 2/84	1.62 0.12	1 7	2 8	4 7
MO:KANSAS CITY	5/11/84	1.55 0.08	2 5	-5 6	4 5
MO:ST LOUIS	5/ 2/84	1.57 0.12	-2 7	-4 8	-3 7
MS:JACKSON	5/16/84	1.53 0.12	6 7	-3 8	0 7
MT:HELENA	5/ 7/84	1.58 0.08	2 5	-5 6	0 5
NC:CHARLOTTE	5/ 7/84	1.51 0.23	2 14	-13 19	-1 14
ND:MINOT	5/29/84	1.47 0.12	-1 7	-5 8	2 7
NE:OMAHA	5/11/84	1.32 0.12	2 7	-3 8	0 7
NH:MANCHESTER	5/ 7/84	1.54 0.12	0 7	-4 8	0 7
NJ:TRENTON	5/ 9/84	1.50 0.12	4 7	0 8	-5 7
NV:LAS VEGAS	5/ 1/84	1.51 0.12	-2 7	3 8	-1 7
NY:BUFFALO	5/ 7/84	1.65 0.12	-2 7	-3 8	1 7

TABLE 13 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

MAY 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
NY:NEW YORK CITY	5/ 7/84	1.52 0.08	-1 5	2 6	-3 5
NY:SYRACUSE	5/ 7/84	1.53 0.12	6 7	0 8	-3 7
OH:CINCINNATI	5/ 9/84	1.61 0.12	-2 7	-2 8	0 7
OH:CLEVELAND	5/ 7/84	1.59 0.12	-3 7	3 8	-4 7
OK:OKLAHOMA CITY	5/ 7/84	1.38 0.12	6 7	-6 8	-3 7
OR:PORTLAND	5/ 8/84	1.51 0.12	3 7	-2 8	1 7
PA:PHILADELPHIA	5/ 7/84	1.54 0.12	-1 7	-5 8	-2 7
PA:PITTSBURGH	5/ 8/84	1.53 0.12	-4 7	1 8	-2 7
PC:CRISTOBAL	5/24/84	1.54 0.12	7 7	2 8	0 7
PR:SAN JUAN	5/17/84	1.63 0.12	-1 7	-6 8	0 7
TN:CHATTANOOGA	5/ 7/84	1.59 0.08	2 5	-3 6	0 5
TN:KNOXVILLE	5/ 7/84	1.79 0.23	7 14	-6 20	-1 14
TN:MEMPHIS	5/30/84	1.53 0.12	2 7	-1 8	1 7
TX:AUSTIN	5/ 8/84	1.59 0.09	0 5	-4 6	-3 5
UT:SALT LAKE CITY	5/ 7/84	1.59 0.12	-2 7	-1 8	3 7
VA:NORFOLK	5/10/84	1.56 0.12	0 7	-3 8	0 7
VT:BURLINGTON	5/ 7/84	1.64 0.12	3 7	-1 8	4 7
WI:MILWAUKEE	5/ 1/84	1.58 0.12	0 7	2 8	-1 7
WY:LARAMIE	5/ 7/84	1.54 0.12	-2 7	-3 8	6 7

s SIGMA COUNTING ERROR

TABLE 14

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

1 JUNE 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
AL:MONTGOMERY	6/ 8/84	1.48 0.12	1 7	-2 9	4 7
AR:LITTLE ROCK	6/ 4/84	1.32 0.08	2 5	2 6	2 5
AZ:PHOENIX	6/ 5/84	1.59 0.13	-3 7	5 9	1 7
CA:LOS ANGELES	6/19/84	1.64 0.09	2 5	-3 6	0 5
CA:SACRAMENTO	6/ 4/84	1.61 0.13	2 7	-1 9	-1 7
CA:SAN FRANCISCO	6/ 6/84	1.56 0.13	2 7	-5 9	-1 7
CO:DENVER	6/ 1/84	1.46 0.08	-2 5	-2 6	2 5
CT:HARTFORD	6/ 4/84	1.60 0.09	1 5	0 6	-2 5
DC:WASHINGTON	6/ 1/84	1.58 0.13	2 7	-3 9	1 7
FL:TAMPA	6/ 5/84	1.55 0.09	16 5	-2 6	0 5
GA:ATLANTA	6/ 4/84	1.60 0.13	4 7	-3 9	3 7
HI:HONOLULU	6/ 4/84	1.63 0.13	-2 7	-9 9	-3 7
IA:DES MOINES	6/ 4/84	1.53 0.09	1 5	-2 6	0 5
ID:IDAHO FALLS	6/22/84	1.65 0.13	-2 7	2 9	3 7
IL:CHICAGO	6/ 4/84	1.52 0.13	5 7	2 9	3 7
IN:INDIANAPOLIS	6/ 4/84	1.41 0.12	2 7	0 8	1 7
KS:WICHITA	6/ 5/84	1.63 0.13	-4 7	0 9	3 7
KY:LOUISVILLE	6/ 4/84	1.52 0.13	3 7	-3 9	4 7
LA:NEW ORLEANS	6/11/84	1.52 0.13	6 7	3 9	1 7
MA:BOSTON	6/ 5/84	1.49 0.09	2 5	2 6	-2 5
MD:BALTIMORE	6/ 1/84	1.29 0.12	-3 7	-1 8	-1 7
ME:PORTLAND	6/ 5/84	1.61 0.13	6 7	-2 9	0 7
MI:DETROIT	6/ 7/84	1.51 0.13	3 7	-1 9	2 7
MI:GRAND RAPIDS	6/ 4/84	1.54 0.13	2 7	-1 9	2 7
MN:MINNEAPOLIS	6/ 5/84	1.65 0.13	0 7	-6 9	0 7
MN:ST PAUL	6/ 5/84	1.60 0.24	6 18	5 19	-3 14
MO:KANSAS CITY	6/ 8/84	1.62 0.13	0 7	-7 9	2 7
MO:ST LOUIS	6/ 6/84	1.47 0.12	-1 7	-2 9	2 7
MS:JACKSON	6/ 6/84	1.67 0.13	-1 7	2 9	0 7
MT:HELENA	6/ 5/84	1.57 0.13	4 7	-4 9	1 7
NC:CHARLOTTE	6/ 4/84	1.83 0.23	14 15	11 20	12 14
ND:MINOT	6/25/84	1.58 0.13	3 7	3 9	-1 7
NE:OMAHA	6/ 8/84	1.26 0.08	2 5	-4 6	0 5
NH:MANCHESTER	6/ 5/84	1.61 0.13	2 7	-4 9	-1 7
NJ:TRENTON	6/ 6/84	1.57 0.09	1 5	-2 6	-2 5
NM:ALBUQUERQUE	6/11/84	1.44 0.12	2 7	3 9	0 7
NV:LAS VEGAS	6/12/84	1.59 0.13	4 7	0 9	1 7
NY:BUFFALO	6/ 4/84	1.53 0.13	-1 7	1 9	-1 7

TABLE 14 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JUNE 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s		^{140}Ba pCi/l±2s		^{131}I pCi/l±2s	
NY:NEW YORK CITY	6/ 4/84	1.52 0.09	1	5	-3	6	2	5
NY:SYRACUSE	6/ 4/84	1.52 0.13	1	7	4	9	2	7
OH:CINCINNATI	6/ 4/84	1.58 0.06	0	4	-4	5	-1	4
OH:CLEVELAND	6/11/84	1.54 0.13	-1	7	-6	9	0	7
OK:OKLAHOMA CITY	6/ 4/84	1.44 0.12	0	7	2	9	-1	7
OR:PORTLAND	6/ 4/84	1.47 0.12	1	7	1	8	-1	7
PA:PHILADELPHIA	6/ 4/84	1.49 0.12	4	7	-2	9	2	7
PA:PITTSBURGH	6/ 6/84	1.44 0.12	1	7	-3	9	1	7
PC:CRISTOBAL	6/20/84	1.53 0.13	9	7	0	9	4	7
PR:SAN JUAN	6/13/84	1.71 0.24	5	18	6	19	1	14
SD:RAPID CITY	6/ 6/84	1.55 0.13	1	7	-5	9	0	7
TN:CHATTANOOGA	6/ 4/84	1.46 0.12	-1	7	-5	8	0	7
TN:KNOXVILLE	6/ 2/84	1.61 0.23	3	14	-12	19	2	14
TN:MEMPHIS	6/28/84	1.56 0.13	0	7	4	9	-5	7
UT:SALT LAKE CITY	6/ 4/84	1.55 0.13	-3	7	6	9	-1	7
VA:NORFOLK	6/14/84	1.61 0.13	3	7	-3	9	2	7
VT:BURLINGTON	6/ 4/84	1.49 0.12	1	7	-5	8	-4	7
WA:SEATTLE	6/ 4/84	1.60 0.09	0	5	0	6	0	5
WI:MILWAUKEE	6/ 1/84	1.46 0.12	4	7	-3	9	-3	7
WV:CHARLESTON	6/11/84	1.59 0.09	0	5	-2	6	1	5
WY:LARAMIE	6/ 5/84	1.60 0.13	2	7	-1	9	-2	7

s SIGMA COUNTING ERROR

TABLE 15

STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK

EPA REGIONAL COMPOSITES

APRIL - JUNE 1984

EPA REGION	^{90}Sr pCi/l ± 2s		^{89}Sr pCi/l ± 2s*	
I	2.4	1.5	0	2
II	2.0	0.7	0	1
III	2.6	0.4	0	1
IV	1.8	0.8	1	1
V	3.1	0.7	0	1
VI	2.6	0.6	0	1
VII	1.6	1.0	2	2
VIII	1.1	1.0	2	2
IX	0.8	0.5	1	1
X	1.8	0.6	2	1

s SIGMA COUNTING ERROR

s* ANALYTICAL ERROR TERM WHICH CLOSELY APPROXIMATES THE COUNTING ERROR

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